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09/523,329	03/10/2000	Timothy M Schmidl	TI-29503	5461

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EXAMINER	
PHUNKULH, BOB A	
ART UNIT	**PAPER NUMBER**
2661	3

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Please find below and/or attached an Office communication concerning this application or proceeding.

TS

Office Action Summary	Application No. 09/523,329	Applicant(s) SCHMIDL ET AL.	
	Examiner Bob A. Phunkulh	Art Unit 2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 March 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *46-53* is/are allowed.

6)☒ Claim(s) *1-5,7-13,15-45,54-59 and 62* is/are rejected.

7)☒ Claim(s) *6,14,60 and 61* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Objections

Claim 54 is objected to because of the following informalities: in line 6, please correct "a base station" to –the base station--. Appropriate correction is required.

Claim 55 is objected to because of the following informalities: in line 4, please correct "a base station" to –the base station--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-5, 12, 35-39, and 45 are rejected under 35 U.S.C. 102(e) as being anticipated by Tiedemann, Jr. (US 5,926,470).

Regarding claim 1, Tiedemann, Jr. discloses a method of communicating data between a base station having a plurality of antennas and at least one mobile terminal, the method comprising the steps of:

-transmitting from the base station, derived versions of a midamble signal to each antenna within the plurality of antennas (antennas 334, 336, see figure 13); and

-providing a distinct delay associated with each derived version of the midamble signal and its respective antenna (see col. 28 lines 46-65).

Regarding claim 2, Tiedemann, Jr. discloses The method according to claim 1, wherein each derived version of the midamble signal is the midamble signal itself (see col. 28 lines 46-65).

Regarding claim 3, Tiedemann, Jr. discloses at least one derived version of the midamble is formed by scaling the amplitude of the midamble signal (adjusting the level of the signal transmitting by antenna 336, see col. 28 lines 46-65).

Regarding claim 4, Tiedemann, Jr. discloses at least one derived version of the midamble is formed by shifting the phase of the midamble signal (see claim 19).

Regarding claim 5, Tiedemann, Jr. discloses at least one derived version of the midamble is formed by scaling the amplitude and shifting the phase of the midamble signal (adjusting the level of the signal transmitted by antenna 336 and claim 19).

Regarding claim 12, Tiedmann, Jr. discloses the derived versions of a midamble signal transmitted to each antenna are associated with a code division multiple access data signal (see col. 5 line 26-53).

Regarding claim 35, Tiedemann, Jr. discloses a data communication system comprising:

-a base station having a plurality of spaced apart antennas (antennas 334, 336, see figure 13);

-means for transmitting from the base station, derived versions of a midamble signal to each antenna within the plurality of spaced apart antennas (transmitter 330, see figure 13); and

-means for providing a distinct delay associated with each derived version of the midamble signal and its respective antenna within the plurality of spaced apart antennas (see col. 28 lines 46-65).

Regarding claim 36, Tiedemann, Jr. discloses means for scaling a midamble signal to generate a derived version of the midamble signal (see col. 28 lines 46-65).

Regarding claim 37, Tiedemann, Jr. discloses means for phase shifting a midamble signal to generate a derived version of the midamble signal (see claim 19).

Regarding claim 38, Tiedemann, Jr. discloses means for scaling and phase shifting a midamble signal to generate a derived version of the midamble signal (adjusting the level of the signal transmitted by antennas 336, and claim 19).

Regarding claim 39, Tiedemann, Jr. inherently discloses at least one mobile terminal configured to receive and demodulate a time division duplex communication signal from the base station (see figures 1-4C).

Regarding claim 45, Tiedmann, Jr. discloses the derived versions of a midamble signal transmitted to each antenna are associated with a code division multiple access data signal (see col. 5 line 26-53).

Claims 13, 15-19, 21-26, 28-33, 54-59 are rejected under 35 U.S.C. 102(e) as being anticipated by Uesugi (US 6,314,304).

Regarding claim 13, Uesugi discloses a method for communicating data between a base station having a plurality of antennas and at least one mobile terminal, the method comprising the steps of:

-receiving at the base station, a time division duplex mode uplink signal from each mobile terminal in communication with the base station and estimating a path profile associated with each received uplink signal;

-transmitting from the base station, a time division duplex signal to each antenna within the plurality of antennas; and

-providing a distinct delay associated with each time division duplex signal and its respective antenna.

Regarding claim 15, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a joint detector (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claim 16, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a zero-forcing block linear equalizer (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claim 17, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a zero-forcing block linear equalizer associated with decision feedback (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claim 18, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a minimum mean-square-error equalizer (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claim 19, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time

division duplex signal via a minimum mean-square-error equalizer associated with decision feedback (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claim 21, Uesugi discloses a time division duplex communication system comprising:

-a base station having a plurality of spaced apart antennas (antenna 901-903, see figure 11);

-signal distribution means for coupling time division duplex communication signals between the base station and the plurality of spaced apart antennas (signal separator 904, see figure 11); and

-delay means operatively coupled to the antennas and the signal distribution means for providing a distinct delay in each of the time division duplex communication signals coupled between the base station and the plurality of spaced apart antennas (delay devices 909, see figure 11).

Regarding claim 22, Uesugi discloses at least one mobile terminal having a joint detector for receiving and demodulating a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 23, Uesugi discloses at least one mobile terminal having a zero-forcing block linear equalizer (a decision feedback equalizer 1203) configured to

demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 24, Uesugi discloses at least one mobile terminal having a zero-forcing block linear equalizer having decision feedback capability and configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 25, Uesugi discloses at least one mobile terminal having a minimum-mean-square error equalizer configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 26, Uesugi discloses at least one mobile terminal having a minimum-mean-square error equalizer having decision feedback capability and configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 28, Uesugi discloses a data communication system comprising:

-a base station having a plurality of spaced apart antennas (antennas 901-903, see figure 11);

-at least one mobile terminal in communication with the base station (see figures 14-18); and

-means for providing a distinct delay associated with each antenna such that a time division duplex communication signal coupled between the base station and the plurality of spaced apart antennas can be demodulated within the at least one mobile terminal (delay devices 909, see figure 11).

Regarding claim 29, Uesugi discloses the at least one mobile terminal comprises a joint detector (see figure 14-18 and col. 11 lines 3-61).

Regarding claim 30, Uesugi discloses the at least one mobile terminal comprises a zero-forcing block linear equalizer (see figure 14-18 and col. 11 lines 3-61).

Regarding claim 31, Uesugi discloses the at least one mobile terminal comprises a zero-forcing block linear equalizer having decision feedback capability (see figure 14-18 and col. 11 lines 3-61).

Regarding claim 32, Uesugi discloses the at least one mobile terminal comprises a minimum-mean-square error equalizer (see figure 14-18 and col. 11 lines 3-61).

Regarding claim 33, Uesugi discloses the at least one mobile terminal comprises a minimum-mean-square error equalizer having decision feedback capability (see figure 14-18 and col. 11 lines 3-61).

Regarding claim 54, Uesugi discloses a time division duplex communication system in which system users communicate information signals through a base station using TDD communication signals, the base station having an antenna system comprising:

- a plurality of spaced apart antennas (antenna 901-903, see figure 11);

-signal distribution means for coupling time division duplex communication signals between the base station and the plurality of spaced apart antennas (signal separator 904, see figure 11); and

-variable delay means operatively coupled to the antennas and the signal distribution means for providing a distinct delay in each of the time division duplex communication signals coupled between the base station and the plurality of spaced apart antennas (delay devices 909, see figure 11).

Regarding claim 55, Uesugi discloses at least one mobile terminal having a joint detector for receiving and demodulating a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 56, Uesugi discloses at least one mobile terminal having a zero-forcing block linear equalizer (a decision feedback equalizer 1203) configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 57, Uesugi discloses at least one mobile terminal having a zero-forcing block linear equalizer having decision feedback capability and configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 58, Uesugi discloses at least one mobile terminal having a minimum-mean-square error equalizer configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Regarding claim 59, Uesugi discloses at least one mobile terminal having a minimum-mean-square error equalizer having decision feedback capability and configured to demodulate a delayed time division duplex communication signal received from the base station (see figures 14-18 and col. 11 line 3-61).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 7-11, 40-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tiedemann, Jr. in view of Uesugi.

Regarding claims 7, 40, Tiedemann, Jr. fails to explicitly disclose a base station generated distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a joint detector.

Regarding claims 8, 41, Tiedemann, Jr. fails to explicitly disclose receiving a base station generated distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a zero-forcing block linear equalizer.

Regarding claims 9, 42, Tiedemann, Jr. fails to explicitly disclose receiving a base station generated distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a zero-forcing block linear equalizer in association with decision feedback.

Regarding claims 10, 43, Tiedemann, Jr. fails to explicitly disclose receiving a base station generated distinct delayed time division duplex signal at a respective

mobile terminal and demodulating the distinct delayed time division duplex signal via a minimum-mean-square equalizer.

Regarding claims 11, 44, Tiedemann, Jr. fails to explicitly disclose receiving a base station generated distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a minimum-mean-square equalizer associated with decision feedback.

Regarding claims 7, 40, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a joint detector (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claims 8, 41, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a zero-forcing block linear equalizer (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claims 9, 42, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a zero-forcing block linear equalizer associated

with decision feedback (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claims 10, 43, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a minimum mean-square-error equalizer (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Regarding claims 11, 44, Uesugi discloses receiving a distinct delayed time division duplex signal at a respective mobile terminal and demodulating the distinct delayed time division duplex signal via a minimum mean-square-error equalizer associated with decision feedback (a decision feedback equalizer 1203, see figures 14-18 and col. 11 line 3-61).

Therefore, it would have been obvious to one having ordinary skilled in the art at the time of invention was made to provides the teaching of Uesugi in the system taught by Tiedemann, Jr. in order to provide an inproved antenna arrangement capable of reducing the co-channel interference in a TDMA/TDD communication system.

Claims 20, 27, 34, and 62 are rejected under 35 U.S.C. 103(a) as being unpatentable over Uesugi in view of Hayashi et al. (US 5,598,404), hereinafter Hayashi.

Regarding claims 20, 27, 34, and 62, Uesugi fails to explicitly disclose transmitting each time division duplex communication signal with a code division multiple access data signal.

Hayashi, on the other hand, discloses transmitting each time division duplex communication signal with a code division multiple access data signal.

Therefore, it would have been obvious to one having ordinary skilled in the art at the time of invention was made to includes the teaching of Hayashi in the system taught by Uesugi in order to provides the mobile telecommunication system with capabilities of applying the space diversity technique to the forward link, stabilizing the received power, and reducing interference of the communication radio waves of other stations with the communication radio wave of the local station.

Allowable Subject Matter

Claims 46-53 are allowed.

Claims 6, 14, 60-61 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications intended for entry)

Or:

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Bob A. Phunkulh** whose telephone number is **(703) 308-8251.** The examiner can normally be reached on Monday-Friday from 8:00 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor **Douglas W. Olms**, can be reach on **(703) 305-4703.** The fax phone number for this group is **(703) 872-9314.**

Bob A. Phunkulh

TC 2600
Art Unit 2661
December 29, 2003